Access-Based Business Model Innovation in Frontier Markets: Case Study of Shared Mobility in Timor-Leste

Abstract

Despite the vast amount of research on business model innovation, little is known about what decision-makers must consider while innovating access-based business models in the context of frontier markets. To address this research gap, we develop a comprehensive framework for access-based business model innovation in frontier markets. A participative observation approach is adopted to collect the data on the case study of Microlets, a shared mobility service in Timor-Leste, for validating the framework. We successfully demonstrate the application of the proposed framework to show how access-based business model innovations can minimize issues such as accessibility and affordability, and spur economic growth by giving importance to the factors of contextual intelligence. Three different business model innovation options were compared across the differentiating factors surrounding the contextual requirements of the frontier market to validate the relevance of our framework. By examining factors such as the institutional environment, industry dynamics and infrastructural development, the proposed framework will guide decision-makers to cope up with the inherent uncertainty of frontier markets while developing access-based business models.

Keywords: Frontier markets, contextual intelligence, business model innovation, access-based services, shared-mobility, Timor-Leste.

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1.0 Introduction

Throughout history, frontiers stood for unexplored opportunities, untapped potentials and offered the chance to discover the unknown. For today's organizations, frontier markets are expected to offer all of the above and even more (Graham & Emid, 2013). Research does not offer an exact definition on frontier markets, yet describes them as pre-emerging or next-generation emerging markets (HSBC, 2012). Musacchio and Werker (2016) outlined three criteria to identify a frontier market – faltering prosperity, corruption, and arbitrary enforcements of rules and regulations. A frontier market possesses one or more of these three criteria. Prominent frontier markets include Bangladesh, Myanmar, Kenya, Uganda, Pakistan, Vietnam and Timor-Leste among others. All these markets possess at least one of the criteria defined by Musacchio and Werker (2016) (detailed description of the criteria is provided in **Appendix A** and comparison of different frontier markets with respect to the criteria is presented in **Appendix B**).

In recent years, the growth potential in most prominent emerging markets came under intense scrutiny as it started to slow down or even deteriorate (Redman & Sai, 2016). With respect to market growth, frontier economies are at a stage where emerging markets were 10-15 years ago and they are expected to follow a very similar path as their emerging market counterparts. Frontier markets are seen as a new source of economic growth with rewarding returns on investments in the long-run (Graham & Emid, 2013). This growth narrative makes frontier markets an extremely attractive place to conduct business.

At the same time, frontier markets present numerous challenges as large percentages of their populations are still at the base of the economic pyramid (BoP[1]) without access to basic services such as mobility, healthcare, education, and drinking water (Prahalad & Hammond, 2002; Hill, 2002; Mair et al., 2012). Addressing prevalent challenges of frontier markets constitute a wide array of profitable business opportunities. Simultaneously, it may help in lifting the poor out of poverty and enable the respective country to unleash its full economic potential (Hart & Christensen, 2002; Anderson & Markides, 2007; Alvarez et al., 2015; Si et al., 2015).

A possible way of dealing with these issues in frontier markets is through access-based business model innovation. Since many people in these markets are at the BoP, buying products and services can be a difficult undertaking (Prahalad & Hammond, 2002; Anderson & Markides, 2007). Moreover, the risks of owning a product (e.g., financial, performance, and social risk; Schaefers et al., 2016) are an additional disadvantage for BoP consumers. To overcome these chronic constraints for obtaining livelihood improvements, BoP consumers seek alternatives to conventional consumption strategies, such as "communities where sharing of possessions regularly occurs" (Hill, 2008, p. 82) through novel business models (George et al., 2015). Access-based business model innovation would enable people at the BoP to consume livelihood-improving products through temporary ownership by paying a usage fee, which is much lesser than the ownership price (Carroll & Buchholtz, 2012; Matzler et al., 2015).

[1] According to Financial Times, Bottom of the Pyramid (BOP) is a "socio-economic concept that allows us to group that vast segment - in excess of about four billion - of the world's poorest citizens constituting an invisible and unserved market blocked by challenging barriers that prevent them from realising their human potential for their own benefit". Typically, people belonging to this group earn less than $2.50 a day.

In the context of frontier markets, access-based business model innovation can occur through the adoption or recombination of similar business models from the developed world to leapfrog evolutional stages (Anderson & Billou, 2007). However, operations in such environments are impeded by the lack of functioning institutions and country-specific factors that can create high uncertainty and ambiguity along the decision-process (Khanna et al., 2005; Parmigiani & Rivera-Santos, 2015). Thus, decision-makers must first gather reliable insights and be aware of the unique characteristics of the context they are operating in before innovating on access-based business models (Khanna, 2014; Kutz, 2017).

Arnold & Quelch (1998) argue that companies need to reconsider their frameworks before applying them to a different contextual setting such as frontier markets. Decision-makers often assume that frontier or emerging markets will follow the same development path as today's developed markets and try to apply the same framework-logic to any given situation (Arnold & Quelch, 1998). Oftentimes, that leads to unsubstantiated decisions that are only uncovered when it is too late. Khanna (2014) supports this hypothesis and explains that contextual intelligence is required when doing business in frontier markets. Therefore, the overarching research objective of this study is to investigate the how of access-based business model innovation by integrating it with the characteristics of frontier markets to determine the information needs of decision-makers.

Even though a lot of frameworks and tools have been developed to support executives in their decision-making, there is no framework to the best of our knowledge that addresses the challenges decision-makers face in the context of frontier markets when they want to innovate existing business models – particularly in the case of access-based solutions. Although a vast amount of research on business model innovation in the sharing economy has been conducted,

little is known about it in the context of frontier markets. Therefore, this research attempts to answer the following specific research questions:

> ***RQ 1:*** *What are the information needs of decision-makers when innovating access-based business models in frontier markets? How should a decision-maker go about innovating the business model for frontier markets?*
>
> ***RQ 2:*** *How valid is the developed framework when being applied to a shared urban mobility solution in Timor-Leste? What are the possible business model options for the city mobility in Timor-Leste?*

The research setting of this study embedded with the research questions are presented in **Figure 1**.

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2.0 Literature Background

In this section, we establish the key aspects of business model research, its foundations in theory and the link to the concept of access-based business model innovation. Subsequently, further background on frontier markets is provided by specifically focusing on the challenges in doing business.

2.1 Understanding the need for business model

The expression *business model* has its origins in the writings of Peter Drucker and has gained significant prominence in the last one decade (Casadesus-Masanell & Ricart, 2010; Ernkvist, 2015; Yun et al., 2016; Ghezzi et al., 2015; Lee et al., 2012). According to Gassmann et al. (2014), *business model* has become a buzzword in several boardrooms today. Peter Drucker describes the term as *assumptions about what a company gets paid for* and describes

these assumptions as being about identifying customers and competitors, their values and behavior, technology and its dynamics and about a company's strengths and weaknesses (Drucker, 1994). However, there is no widely accepted definition of business models according to Markides (2013). Different existing definitions of business models are captured in Table 1. For the purpose of this paper, we have chosen the definition of Gassmann et al. (2014) as it represents a collectively exhaustive definition with direct practical applicability.

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Although business models are seen as a key component for success of private organizations operating with a profit-motive, they are also highly relevant for non-profits, government agencies, and social enterprises which are not seen as businesses in a broader sense (Kaplan, 2011). Despite the fact that non-profit organizations are not generating profits for their owners and investors, they still generate revenues, provide services and finance activities with contributions. Similarly, government agencies are financed by taxes, fees and service revenues. They also have a cost structure for the services they provide whilst being held accountable by the citizens for economic prosperity and social system solutions (Hirschinger et al., 2016). The nature of business models in the public sector are more implicit and are oftentimes not perceived as such. Therefore, any organization (be it public or privately owned, operated for social or economic objectives, in developed, emerging, or frontier markets) that wants to develop and sustain itself has to think in business models grounded in its respective context (Gnatzy & Moser, 2012; Kaplan, 2011).

In the past 50 years, the average life span of a business model has decreased from 15 years to less than 5 years (BCG, 2017). The main cause of this sinking lifespan lies within innovation and disruption accelerated through new technological opportunities that has enabled

faster moving cycles in business (Manyika et al., 2015). These faster business cycles, increasing globalization and competitive pressures are all trends that threaten formerly prominent business models. Changing markets, new technologies and new market players all contribute to the VUCA[2] nature of today's business environment and eventually make many existing products and processes obsolete (Gassmann et al., 2014). Amit and Zott (2012) elaborated on three distinct points on why organizations should innovate their business models – to leverage existing capabilities while allowing organizations to tap into new markets and access a broader customer base, as an enabler and protector of competitive advantage, and as enabler for executives to be ahead of competition.

2.2 Why access based business model innovation is relevant in frontier markets?

The access based business model considered in our study deals with the economic activity where the consumers prefer to pay for the goods and/or services as per the usage and consumption of the same. This is in sharp contrast to initiating a fixed transaction irrespective of the amount of use and/or consumption. This is in alignment with the concept of sharing economy where preference of individuals is to rent or borrow goods instead of directly purchasing and owning them. In this era of sharing economy, access-based business model has found increasing attention as an innovative and alternative consumption mode (e.g., Bardhi and Eckhardt, 2012; Wittkowski et al., 2013; Hamari et al., 2016; Schaefers et al., 2016; Schor, 2016). Prominent examples include car and bike sharing (e.g., Zipcar, Capital Bikeshare), room sharing in the hotel industry (Zervas et al., 2017) and short-term rental of fashion items (e.g.,

[2] The term VUCA stands for Volatility, Uncertainty, Complexity and Ambiguity. It describes the dynamic and fast-changing nature of business environments of today (Horney et al., 2010).

Bag Borrow & Steal). There have been numerous studies in understanding how firms behave in a sharing economy. For instance, Cusumano (2015) analyze how firms compete in a sharing economy setup. Möhlmann (2015) find the determinants of satisfaction and the likelihood of adopting the sharing economy business model again. Then there are studies involving the impact of sharing economy business models on sustainability. Heinrichs (2013) presented a new perspective on how sharing economy business models can be a potential tool to achieve sustainability in the surrounding region. Martin (2016) presented a counter argument on the claim that whether sharing economy business models leads to sustainability in the region. On similar lines, Malhotra and Van Alstyne (2014) and Schor (2016) highlight the negative sides of sharing economy business models.

Despite the growing attention, existing research on access-based business model has only focused on developed economies (e.g., Bardhi and Eckhardt 2012; Wittkowski et al., 2013; Belk, 2014; Lawson et al., 2016; Schaefers et al., 2016). None of the studies have attempted to understand how one should go about access-based business model innovation in frontier markets where it has been argued to have a transformative impact, especially in the BoP context of frontier markets (e.g., Blocker et al., 2013; Karnani 2007; Schaefers et al., 2018).

Over a time span of 35 years, frontier markets have shown a real GDP compounded annual growth rate (CAGR) of 3.3% compared to a real GDP CAGR of 2.5% in developed countries. Moreover, during 23 of the last 35 years, economic activity has been more rapid in frontier markets compared to developed markets (Redman & Sai, 2016). Despite the strong economic growth in emerging markets, frontier markets appeared to perform even better during that time span (real GDP CAGR of 5%) and the normalized standard deviation in real GDP

growth is twice as high than that of Morgan Stanley Capital International (MSCI) emerging markets index (Redman & Sai, 2016). Therefore, frontier markets are forecasted to perform significantly stronger than developed and emerging markets.

Even though there are numerous opportunities that make frontier markets as the next rising destinations of go-to markets, there are considerable challenges that must be faced before tapping the opportunities. One of the key factors when conducting business in frontier markets is its market governance that is linked with the institutions term of the World Economic Forum (WEF[3]) Competitiveness Index (Redman & Sai, 2016). The level of market governance is assessed using eight factors, which are political rights, civil liberties, corruption, ease of doing business, government effectiveness, regulatory quality, rule of law, and Gini[4] index. Frontier markets score poorly in five (corruption, ease of doing business, government effectiveness, regulatory quality, and rule of law) out of eight factors in comparison to emerging markets.

Table 2 summarizes the areas of improvements and most important challenges faced in frontier markets. A clear identification of the challenges helps entrepreneurs, multinational corporations (MNC's[5]) and government agencies to determine where they should focus while innovating business models contextualized in frontier markets to maximize the growth potential and marginal utility for associated stakeholders. Based on the challenges introduced for decision-makers in frontier markets, a contextually adequate business model needs to be

[3] World Economic Forum (WEF) is an international non-profit organization based out of Geneva. WEF promotes public-private cooperation with the objective of improving the conditions of the world involving economy, education, energy, natural resources, work, gender etc.
[4] Gini Index or Gini Coefficient is a measure of statistical dispersion intended to measure inequality by representing the income distribution of the citizens of a nation.
[5] Multinational Corporations (MNCs) is a corporate entity, which has facilities and assets in more than one country other than its home country.

developed. In the next section, we present a framework for access-based business model innovations to overcome the listed challenges in frontier markets.

---Insert Table 2 here---

3.0 A Framework for Access-Based Business Model Innovation in Frontier Markets

The framework developed in this section combines business model innovation architecture with contextual intelligence by including unique characteristics of frontier markets. Gassmann et al. (2014) established a business model architecture in the form of a triangle covering all aspects of a business model in four pillars – who (centroid), what (node 1), how (node 2), and why (node 3) (**Table 3**). Such business model architecture provides a holistic view by combining internal and external factors of an organization, reducing the complexity around it, and acting as a clear and exhaustive toolkit capable of grasping access-based business models at their core. By answering the questions of all four pillars, the access-based business model becomes tangible and thereby lays the foundation for innovation.

---Insert Table 3 here----

To build onto the business model architecture, Gassmann et al. (2014) proposed a business model navigator with the aim to have a new business model at the end of the process. Business model navigator comprises of four steps – initiation (step 1), ideation (step 2), integration (step 3), and implementation (step 4). Initiation is to analyze the ecosystem, ideation is to adapt the patterns of the existing business model and confront them with patterns that are unrelated to the current business, integration is to detail the business model to achieve tangibility across all four pillars of the triangle, and finally implementation is to realize the plan iteratively. The first three steps cover the design of a new access-based business model and last

step materializes the new access-based business model by developing a prototype and conducting functional tests. Learnings from the last step are used to redesign the developed access-based business model and relaunch the iterative process until the ideal access-based business model has emerged.

Anderson and Markides (2007) derived four prerequisites that decision-makers have to consider for achieving successful business model innovations, especially when it is contextualized for frontier markets. The four prerequisites are affordability, acceptability, availability and awareness. The risk of building a business model that is irrelevant to frontier market customers is high when these factors are ignored.

Affordability measures how easily affordable the goods or services of an organization are to the lower end of the market. It is important to note that a large share of the population in frontier markets are under- or non-consuming customers. For a business model, it is vital to tailor the innovated offering in a way that these people can afford it. Even though they only survive on daily wages and have only limited cash flows, price point needs to be innovatively adapted.

For achieving acceptability, organizations that design new business models must tailor them to the unique needs of the customers depending on the country, region, culture and socioeconomic background. People living in frontier markets, especially people at the BoP have very limited resources to spend. Hence, consumers are skeptical on how they spend their scarce resources and are reluctant to accept new offerings.

Availability describes the extent to which consumers can effectively access a product through the given distribution channels. In frontier markets, distribution channels are often weak or nonexistent due to the underdeveloped infrastructure. Innovated business models must

take that into account and be resourceful about enabling access to the most isolated communities.

In the context of frontier markets, advertising a new product, service or business model to create awareness might be a burdensome task for managers. People at the BoP are not easily reachable by traditional marketing channels. Creating awareness for an innovated business model needs to be taken into account within the development process. These four prerequisites are fundamental to make a business model innovation actionable.

Therefore, to innovate an access-based business model in a unique context like frontier market, it is not sufficient to only know which elements of a business model can be changed and what existing patterns can be applied. The knowledge for business model innovation in frontier market is complete only when decision-makers understand and gather relevant contextual intelligence of frontier markets such as the four prerequisites described above. Oftentimes, widely accepted management practices, frameworks or business approaches are being applied uniformly across different geographies, markets and cultures when doing business. Khanna (2014) criticizes this practice, since conditions (institutional character, physical geography, market dynamics, infrastructure, educational norms etc.) differ enormously from place to place – especially in extremely heterogeneous frontier markets. Moreover, lessons learned in one market do not necessarily transfer to other markets (Kutz, 2017). Therefore, frameworks must be reconsidered before applying them to a different contextual setting (Arnold & Quelch, 1998), or rather they have to be extended with contextual intelligence (Khanna, 2014).

In the following, we integrate the components of business model innovation with the dimensions of contextual intelligence about frontier markets to finally develop a complete

framework (**Figure 2**). The framework comprises of two parts – analytical and foundational. The analytical part of the framework (upper part) consists of steps that are directly applicable to a particular case study in frontier markets for which the access-based business model is innovated. The foundational part of the framework (lower part) builds a stable basis with prerequisites that decision-makers must always respect while developing a new access-based business model. Both these parts of the framework are discussed in detail below.

---Insert Figure 2 here---

3.1 Analytical part of the framework

The core of the framework (inner circle) represents the business model navigator designed by Gassmann et al. (2014). Due to the importance of contextual intelligence in frontier markets, the business model navigator is embedded into a layer of contextual intelligence (outer circle). The idea behind this distinctive setup is that whenever an organization starts to think about their business model and how to innovate it, they must be fully aware of the context they operate in during the whole process. According to Kellerman (2014), contextual intelligence consists of four different dimensions - institutional environment (government, legal framework, politics, intermediaries, and media), industry dynamics (competition, clusters, market structures), infrastructural development (technology, mobility infrastructure, energy infrastructure) and cultural background (religious beliefs, behavioral barriers, community norms and traditions, history). The framework developed is discussed across the four dimensions of contextual intelligence for frontier markets.

Institutional environment. Developed markets have intermediaries and institutions to provide the needed intelligence for decision-makers and to enforce contracts needed to facilitate transactions. But frontier markets are dominated by institutional voids that lead to

uncertain regulatory environments, inefficient judicial systems and unreliable sources of information (Gaur et al., 2007). Khanna and Palepu (2010) evaluated what organizations must analyze to gain the full spectrum of institutional environment in a frontier market and listed six market institutions, namely credibility enhancers (e.g. auditors, certification and accreditation agencies), information analyzers and advisers (e.g. research firms, rating agencies, publications), aggregators and distributors (e.g. mass retailers, logistics companies, venture capitalists), transaction facilitators (e.g. online payment, credit card issuers, stock exchanges), adjudicators (e.g. courts and arbitrators), and regulators and policymakers. Considering these six institutions combined with the general legal framework, corruption, political structure as well as educational and financial institutions of a targeted market helps organizations to gain a clear view on the institutional terrain (Khanna & Palepu, 2010). Attention has to be paid for both formal (laws, regulations, rules) and informal institutions (norms, cultures, ethics).

Industry dynamics. An adequate view on how the industry works is crucial for contextual intelligence (Khanna, 2014). According to Porter (2008), industry structures determine a strategy of an organization in frontier markets. Industry dynamics that are misunderstood can lead to low returns and unsuccessful approaches in business model innovation. Moreover, it is crucial to get to know how potential customers think to tailor the product or service offer accordingly. Organizations have to profoundly understand the extent of consumption access in frontier markets, as most of frontier markets' population is at the BoP and are faced with scarce consumption abilities due to the low income.

Infrastructural development. In 2016 *Global Competitiveness Report* of WEF*,* mobility infrastructure (roads, railroads, ports, airports, public transport) as well as energy infrastructure (electricity supplies), healthcare and telecommunication network (for efficient

business communication and digitalization) are included as the key infrastructural dimensions and one of the greatest challenges in frontier markets. Especially relevant in these environment is the technological readiness of the particular country because they often offer great leapfrogging potential (Athreye & Godley, 2009). Thus, the infrastructural dimensions are important for contextual intelligence due to the differences in development in each of the markets. In order to gather relevant insights of the infrastructural dimensions, the first step is to analyze what infrastructural needs and touchpoints the current business model has and then deepen the analysis accordingly (Casadesus-Masanell & Ricart, 2010).

Cultural background. Operating in a different context implies different cultural settings in many cases (Khanna, 2014). Cultural distance is an important parameter in understanding entry mode choice, performance of foreign invested affiliates (Agarwal, 1994; Popli et al., 2016; Shenker, 2001; Tihanyi et al., 2005). Cultural conflicts play a major role especially when laying the foundation for business model innovation in frontier markets. Therefore, cultural intelligence requires a specific understanding of community norms, religious beliefs, negotiation differences, behavioral patterns, commutation differences, knowledge about the human capital. Essentially, knowing how to deal with a different culture is crucial to tailor the right business model innovation approach (Kutz, 2017; Miska et al., 2017).

Table 4 groups the identified frontier market challenges into the four contextual dimensions. Understanding the challenges in any given market contributes to better grasping the context in which the organization is operating and thus provide directions for innovating a business model. It also helps decision makers in better understanding their information needs while gathering intelligence for each of the contextual intelligence dimensions. The first

challenge is related to the institutional environment. This includes factors such as corruption in the host country, shortage of capital and liquidity with stakeholders working in the environment and lack of human capital for a given work. This is because the human capital in frontier markets typically do not possess the requisite skills to carry out specialized activities, The second challenge is related to industry dynamics which encompasses factors such as uncertainty and volatility of the industry in which the current activity operates. The third challenge, which is the most obvious among frontier markets, is the lack of infrastructural support to carry out businesses. For instance, frontier markets cannot adopt IoT related infrastructure due to lack of internet connectivity bandwidth across the country. The final challenge is the lack of access to essential goods such as clean drinking water, healthcare etc.

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3.2 Foundation part of the framework

The foundation of the framework is designed according to the four prerequisites discussed above (i.e. affordability, acceptability, availability, and awareness). They are necessary to fully assemble business model innovation in frontier markets. The familiarity and implementation of these prerequisites provide the necessary stability to the framework as they represent the mindset that organizations must have to conduct business model innovation in frontier markets (Anderson & Markides, 2007).

When deploying the frontier market business model innovation framework, it is important to note that the implementation has to follow a sequential process as visualized in **Figure 3**. For a successful implementation of the frontier market business model innovation framework, it is important to initially analyze the factors defined through the gathering and processing of contextual intelligence. This enables organizations to first gather insights into the

context they are considering operating in and what helps them to navigate from there. In the subsequent step, the business model navigator is applied.

In the next section, we discuss and elucidate the rationale behind our methodology and the steps taken forward in collecting the data to answer our research questions.

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4.0 Case Study Context and Data Collection: Microlets in Timor-Leste

In order to validate the practicability of the proposed framework, the case study method is chosen as it is known for its relevance in examining real-life situations by conducting an empirical enquiry to investigate a particular phenomenon within its context (Yin, 2013). The developed framework is tested on a case study dealing with Microlets, a shared mobility service provider solution in Dili, the capital of Timor-Leste, with an objective to develop options of improved, access-based business models compared to the existing solution.

According to *The World Factbook on Timor-Leste*, the city of Dili is the capital of Timor-Leste and also the country's largest city with a population of about 250,000. Timor-Leste is Asia's youngest nation, having gained independence from Indonesia in 2002 following a promising path of growth since then. According to the 2017 *Timor-Leste Overview* report of *The World Bank*, the GDP in absolute terms accounts for $1.442bn (2015) while GDP growth is at about 6% (2014). In the years of 2008 and 2011, the GDP growth has even been above 14%, yet the amplitude is highly volatile. This makes Timor-Leste, an interesting frontier market (Joseph & Hamaguchi, 2014). Like every other frontier market, Timor-Leste also faces several challenges even after achieving tremendous growth rates since its independence in 2002. According to *Timor-Leste – Strategic Development Plan 2011-2030*, the most pressing

challenges that Timor-Leste currently has to deal with are the poor infrastructure across the country (roads, water, sanitation, power), industry and trade bottlenecks (inadequate capacities at sea ports and airports), a shortage of skilled and trained labor and an underdeveloped private sector. Further, economic policy makers are challenged to address the uneven distribution of access to necessities such as mobility, water, health and education (Cullen & Marx, 2015).

Table 5 lists the public transportation industry players and their characteristics in Timor-Leste. According to a report of *The Asia Foundation*, the most convenient way of transportation in Dili is through Microlets (Cullen & Marx, 2011). Microlets are small vans that can be accessed through a side door and has a capacity to carry 14 passengers. These vehicles are operated by a driver and an assistant. Fares are regulated by the government and are capped at US$0.25. The same fare is charged regardless of the distance that a user travels in the Microlet. People aspiring to become Microlet operators need to be in possession of a Microlet van and have to submit an application to the Department of Land Transport where a particular route is assigned to the operator. The majority of the Dili city is covered by 10 predetermined routes which the registered operators are obliged to serve. Currently, there are 623 Microlets registered in Timor-Leste and most of them operate in Dili (Cullen & Marx, 2015).

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The current access-based city mobility offerings including the Microlets in Timor-Leste are largely inadequate, inefficient and too costly for local incomes (Cullen & Marx, 2015). Microlets are often overloaded with too many passengers who threaten safe operations of the vehicles. The average walking time to the nearest transportation pick-up point is 31 minutes and it takes 110 minutes on average for urban citizens to reach the nearest markets, educational

institutions or hospitals by foot (Cullen & Marx, 2015). These issues are even more burdensome for people that are not located in the city. For the largest proportion of the population, private ownership of vehicles, even motor bikes, is unaffordable. The vast majority of Timor-Leste's citizens, especially the population at BoP (Prahalad & Hart, 2002), rely on access-based public transport such as Microlets for their everyday needs including education, healthcare, workplace and market access (both selling and buying products) (Cullen & Marx, 2015). For instance, public transport is inevitable for farmers to transport their harvest from rural to urban areas as they cannot afford their own vehicles. The costly nature of the current public transportation offerings, long waiting times and uncertainty of departure times due to the lack of scheduling in Microlet's present business model leads to a lack of access to mobility for most of the population even within the city of Dili.

4.1 Research methodology and data collection

We adopted participative observation approach for collecting data in our case study (Boyle, 1991; Spradley, 2016). The objective of the participant observer was to understand real-time the current situation of mobility in Timor-Leste and capture the inefficiencies the people of Timor-Leste were encountering. Since the objective was to capture the complete situation in real-time to holistically understand the inefficiencies experienced with mobility in Timor-Leste, a participative observation approach was found more appropriate in comparison to structured or semi-structured interviews, which are typically carried out to analyze an event of the past by directing specific theme driven questions (Savage, 2000). The participative observation approach also helped in efficiently tackling the sharing of incomplete information by government officials, business representatives and other economically disadvantageous informants in comparison to interviews (Becker & Geer, 1957).

The participant observer, one of the co-authors, gathered data by being physically present in Timor-Leste. He was accompanied by a local guide, a German business woman, who spoke German, English and Tetum and had lived in East-Timor for 7 years already. The support of the local guide was sought to address the language and cultural barriers in the field. The daily experience of people with mobility services in Timor-Leste were captured through unstructured conversations with different stakeholders, observing conversations between stakeholders, and gathering and archiving of related documents from the field. In addition, the participant observer tested the mobility system over a couple of weeks on different occasions to ensure that single events and experiences were not influencing the analysis of the situation. The participant observer, thus, entered into conversations with randomly chosen people who were encountering the issue to understand their interpretations and opinions of that particular situation. This is in alignment with the standard procedure followed in the case of participative observations (Savage, 2000).

To reduce ambiguity, enhance validity, and ensure consistency in the observations and their interpretations of the situation, we adopted multiple triangulation procedures. First, the participant observer discussed the insights gathered with different subject matter experts on Timor-Leste and mobility. This addressed the major limitations or counter assertions of the participative observation methodology including the introduction of subjectivity and ambiguity by the observer (Savage, 2000). Second, the participant observer also ensured to analyze and summarize the data on daily basis wherever possible. This helped in further reducing the ambiguity that is common to data collection through observations where the amount of detailed description is immense (Becker, 1958). Third, the counter assertion whether the informants' statements in unstructured conversations remain the same in the absence of the participant

observer were triangulated through passive observation of conversations between different stakeholders and by referring to different archived documents as well as observations of the local guide who had made similar observations. This triangulation not only confirmed the consistency of the informants' statements but also ensured the validity of their interpretations. Fourth, another issue with adopting an unstructured conversation in a participative observation approach is the bias caused from observer-informant group equations (Becker, 1958). When observers and informants are interacting, the informant's statement is a function of whether the informant is alone with the observer or in the presence of a group of informants. A statement in absence of other informant members is believed to reflect the accurate perspective of the informant in consideration. Even though the participant observer in our study could not entirely negate the possibility of the informants' biases in the presence of other informant group members, the observer conducted the majority of the interactions in such a way that the group's influence was minimized during the conversation. This bias was also tackled through the passive observation of conversation between different stakeholders and by referring to different archived documents as well as observations of the local guide who had made similar observations.

The progress of Timor-Leste is linked to how the majority of its citizens at the BoP can develop economically and move out of poverty. The prevailing service gaps of today's public transport network are majorly covered by Microlets and lead to significant economic repercussions and impede economic growth. As this inefficient system impedes economic growth and prosperity, the government is equally interested in a sustainable solution for the issues in the existing business model of Timor-Leste. In the next section, we apply the proposed frontier market business model innovation framework to develop new potential business

models for Microlets service providers. These improved business models are expected to be more inclusive, enable better access and better address the drawbacks of the existing access-based business model.

5.0 Case Study Analysis & Results: Using Access-Based Business Model Innovation Framework

In this section, we present the analysis and innovation of access-based business model deployed for Microlets in Dili by applying our proposed framework.

5.1 Contextual intelligence

Institutional environment. *T*imor-Leste is currently positioned at 145 among 190 economies with respect to the 'ease of doing business' ranking of *The World Bank* in 2017. Even though Timor-Leste took significant efforts on fighting corruption with a legal framework, the success of combating it is still far from acceptable (Guterres, 2017). Overall, what dominates in Timor-Leste's institutional environment is the low institutional capacity, poor accountability, absence of transparency mechanisms, weak judicial system, and dysfunctional contract enforcement. There is a moderate presence of transactional facilitators. Therefore, decision-makers planning to invest in Timor-Leste have to take into consideration these large institutional voids.

Industry dynamics. One of the most fundamental services required by the vast majority of citizens in frontier markets is public transportation. Public transport on land in Timor-Leste is almost exclusively operated by the private sector with minimal government intervention. The industry appears to be highly fragmented with numerous operators serving the market. The ownership of vehicles and operation of transportation happens on a small scale through

individual owners and operators. Thus, the fragmented nature of the market can arguably provide a great opportunity for government agencies to set the right incentives for disruption. As a result, taxis, Ojeks and buses are the key competitors of Microlets in Timor-Leste.

Infrastructural development. According to *Timor-Leste – Strategic Development Plan 2011-2030*, lack of proper road conditions, electricity facilities and telecommunication network affects the operation and innovation of Microlets business model. In terms of telecommunication applications and networks, Timor-Leste is relatively well positioned (Cullen & Mary, 2015). The penetration rate of mobile phones in Timor-Leste is high. Key services such as banking, weather updates and government information are also provided through mobile phones (Cullen & Marx, 2015). However, even though mobile phone penetration rate is high, Timor-Leste cannot fully take advantage of it since internet and broadband adopters are still very low with limited coverage.

Cultural background. The culture of Timor-Leste is influenced and characterized by a combination of 16 ethnic groups, speaking 32 different dialects, currently residing in that place, such as the Portuguese, Roman Catholic, Malay etc. Post colonization from Portugal, Timor-Leste has remained primarily a Catholic country with influence from animist beliefs. Although English and Tetum are official languages in Timor-Leste, English and Indonesian are common working languages spoken in the region. Relationship-building is a key component for doing business successfully in this region, It has been observed that workers place punctuality and time at a higher level rather than resorting to delays arising from late arrivals for meetings and appointments. Further, low productivity is a major concern in the region due to lack of local human resources. This amounts to strict instructions being laid down at workplaces for efficient completion of tasks. As a consequence, the decision making follows a strict top-down

approach. To facilitate smooth functioning in the organization, strong leaders are required to initiate the requisite changes within the system.

The above-discussed contextual intelligence required for Microlets in Dili is summarized in **Table 6**.

---Insert Table 6 here---

5.2 Business model navigator

The business model navigator consists of three phases- initiation, ideation and integration. We explain each phase with the objective of transforming the old business model to the new business model through access-based business model innovation. Each phase is elaborated as follows.

5.2.1 Business model navigator - Initiation

The current business model of Microlets is described by addressing the '*who'*, '*what'*, '*how*' and '*why'* dimensions, as outlined in section 3. Microlets follow a business-to-customer approach where they primarily serve the urban and to a lesser extent suburban population of Timor-Leste – mostly in and around Dili. Microlets do not segment customers and charge same fare of $0.25 to all the passengers. The value proposition of Microlets is defined as providing cheap and convenient mobility within Dili through small accessible vans. Vivid decorations and loud music in Microlets aim to enhance the customer experience and differentiates Microlets from other transportation modes. Comparatively, Microlets are the most commonly used and cheapest way to get around the urban and suburban area of Dili.

In order to deliver the value proposition, Microlets randomly drive around assigned routes and pick up passengers that stand at the roadside, waving their hands to signal interest. There are no formal terminals for picking up passengers, no predefined trip schedules, and no

route maps or destination boards on Dili's streets. To get off a Microlet, passengers need to signal their intent to the driver in advance. Owners of licensed Microlets can drive themselves or assign it to a driver. The Timorese government regulates the fee at $US 0.25 per ride and is charged from every passenger irrespective of the distance. Microlet operators act independently and are self-responsible for covering of their cost (purchasing cost of the vehicle, maintenance and its license). Microlets have an incentive to aggressively attract passengers and to overload the vehicles, or postpone the needed repairs and maintenance leading to decreasing safety for passengers.

Current business model requires further attention on three specific aspects. First, there remains a need to modify the business model in terms of bridging mobility of the urban and rural population. Second, Microlets could segment the customers based on distance traveled within the designated route. Third, significant improvements could be introduced to reduce the randomness in terms of passenger pick up due to minimal scheduling of Microlets services with no formal pickup terminals.

5.2.2 Business model navigator - Ideation

The ideation phase focuses on developing ideas that could be applied to the current business model. By applying insights gained from contextual intelligence analysis to entire scope of 55 business model patterns defined by Gassmann et al. (2014), three business model ideas emerged as a result of this process. These ideas were developed in collaboration with a local consulting company and a local foundation and are titled as: *Digitization, Pay per Use* and *Include the Poor.*

First, *Digitization* aims to digitize the existing, analogue mobility service by streamlining processes to increase efficiency and provide opportunities for scale. In the current

business model, passengers are neither digitally connected with operators, nor is there a predefined schedule. By *digitizing* the business model (i.e. by building a mobile application connecting passengers with operators with dynamic GPS routing), efficiency in the matching process can be increased and scalability can be ensured. Further, a dynamic routing model eventually allows for an on-demand service in comparison to the currently existing random matching principle. Secondly, *Pay per Use* describes a business model where actual usage of a service or product is metered, instead of flat prices being paid. The user pays only for what is effectively consumed. Using *Pay per Use* business model enables dynamic and flexible pricing and allows overcoming the ownership dilemma. As people at the BoP cannot afford ownership of their own vehicles and are not served by the current urban Microlet business model, a *Pay per Use* model provides them an opportunity to access mobility without ownership, on an access-based mode. The slightly higher prices caused by the higher distances, compared to rides within the city centre, would still offer a more affordable option than to either purchase a vehicle or being cut off from the markets. Thirdly, *Include the Poor* describes a product or service that specifically targets customers at the BoP. Since most of Timor-Leste's population is positioned at the BoP, targeting the poor is inevitable for development (Hart & Christensen, 2002). Economic growth is highly desired in Timor-Leste and it can be sustainably achieved only by involving the BoP population.

A combination of the above-described three business model innovations addresses all the aforementioned critical points in today's Microlets model. In consequence, combining *Digitization, Pay per Use* and *Include the Poor* requires a change of the '*who'*, '*how',* and '*why'* dimensions of Microlets current business model, which will be discussed in the following section.

5.2.3 Business model navigator - Integration

The integration phase focuses on specification of the identified business model ideas through the revision of '*who', 'how',* and '*why'* pillars of the business model navigator (Gassmann et al., 2014). The '*what'* pillar continues to remain the same as there is no change in the objective of the business model. **Table 7** summarizes the transformation of the current business model to an alternative business model.

---Insert Table 7 here---

First, the innovated business model targets not only urban but also semi-urban and rural areas by creating new routes. Additional routes provides the BoP population with better access to basic services such as healthcare, education and distribution channels. Secondly, the business model is transferred to a demand-responsive, digital mobile application with dynamic routing to improve the matching between passengers and operators. One of the greatest limitations of the current business model is the random matching process between a potential passenger and the operator. This is problematic as passengers have no guarantee if and when a Microlet appears, leading to uncertainty, long and unproductive waiting times. Furthermore, the absence of schedules and formal terminal makes mobility more unpredictable and unplanned. On the other hand, the operators have no overview of potential passengers and lack planning capabilities for the upcoming mobility demand. The issues in the matching process can be solved by leveraging the high mobile phone penetration rate in Timor-Leste and digitizing the business model of Microlets. Thirdly, adapting the idea of *Pay per Use* suggests repealing the cap on the Microlet fares and opening the way for flexible and usage-based pricing. Instead of paying a fixed fare regardless of distance, the innovated business model proposes flexible pricing. The user pays only what he effectively consumes. The repeal of the fixed price

incentivizes operators to not only cover the central urban areas but also cover longer routes to the semi-urban or even rural areas when they can earn more through the longer distances.

5.2.4 Business model navigator - Implementation and alternative solution options

The implementation of a business model is an iterative process (Gassmann et al., 2014). Different options, based on the business model dimensions *'why', 'what', 'how'* and '*why',* need to be specified, tested and learnings need to be iteratively integrated. The implementation phase, in this study, therefore defines three concrete access-based business model options based on the dimensions outlined in the integration step. Three options defined were *Digital pioneer, Urban digital and Pragmatic remote* and each one of them is detailed below. The implementation step is limited to developing the options and mapping them in a strategy canvas.

Digital pioneer. The *digital pioneer* option describes a model of an on-demand shared mobility service that groups together passengers with similar journeys, similar to a ride-hailing service. A dynamic, GPS-based routing-algorithm is used to determine what passenger routes can be grouped in the most efficient way. Flexible pricing based on distance (price/km) or time (price/min) and integrated payment solutions are included in this option. The payment solution can be implemented by using prepaid mobile minutes, which can be purchased at local shops in Dili. Mobile credit transfer between users is already practiced and widespread in Timor-Leste (Cullen & Marx, 2015). Telecommunication providers could act independently to deploy mobile payment services, a practice that has been successfully piloted in other frontier markets, such as M-Pesa in Kenya (Cullen & Marx, 2015). As the application is GPS-based and passengers can directly be located, fixed pick-up terminals are not required. The flexible

pricing model incentivizes operator to cover larger distances and geographical areas due to the adequate payouts tied to it. Thus, this model helps to cover semi-urban and rural areas along with the regular urban areas. An initial platform could be built by an external IT provider financed by the government as a pilot project. To cover some of the investment cost, a small digital license fee could be charged from the users.

Urban Digital. This option keeps the current geographic focus (urban area of Dili) but aims to digitize the business model. Due to focusing on the same urban area and no change in the routes, the fares have to be maintained at US $0.25. A GPS-based algorithm is not required for this option. Instead, fixed pick-up terminals along the defined routes and fixed schedules have to be incorporated to reduce the randomness in matching. A large benefit comes from the automation of payments. The same payment system described in the first option based on prepaid mobile minutes can be used for this option. Automation of payment system saves time for both passengers and operators in comparison to the analogue payment process. The idea is also to introduce an advance-purchase ticketing system in this option. The passenger could use the prepaid minutes to buy a ticket and after successful purchase, passenger receives a text message confirming ticket purchase and allocating a ticket code. The code has to be used for validation while boarding the Microlet. Also, it allows passengers to purchase a specific seat in a Microlet and board at any point on the route.

Pragmatic Remote. The main objective of the third option *pragmatic remote* is to extend the network coverage from urban to semi-urban areas to address the needs of the BoP. Due to the larger distances that need to be covered for operators driving from urban centers to semi-urban villages, flexible, distance-based pricing is inevitable. Keeping fixed prices would only disincentivize operators to drive longer distance. Predetermined pick-up points are highly

desired in this option. Combining fixed pick-up points with a schedule will further bring structure into the current system eliminating the coincidental matching of passenger with operator. A digital payment solution may not be suitable as the penetration of mobile phones is not that high in semi-urban villages.

Figure 4 visualizes the Microlets providers' current business model in comparison to the three innovated business model options along nine differentiating factors. *Digital Pioneer* provides full transparency in terms of fares and routes. In addition, grouping passengers brings down the overall price per person leading to high network coverage. This implies that Microlet operators would attract large profit pools if the target segment consists of large groups of passengers traveling large distances. From the perspective of government agencies, there are significant advantages. First, as a policy directive, *Digital pioneer* offers higher access to mobility within the population. Second, the agency can tap additional revenue source through digital licensing of platforms. A revenue advantage to the government essentially means a potential disadvantage to the operators in terms of high licensing cost. In addition, there is a risk of high competition in the market due to ease of access of the platform from new operators. This is similar to a car-sharing model in certain respects. For instance, the ease of digital platform access has led to many car-sharing models such as Uber, Ola, Jugnoo, Lyft, Grab, etc. In addition, grouping passengers in digital pioneer is similar to "Cab Share" in the car-sharing models where overall price per person goes down as passengers are grouped together in the designated routes. It is however restricted to major cities because of its financial viability in less populated areas. This will be true for *Digital Pioneer* too as failing to attract large group of passengers would make the model financially less viable due to the cost of licensing involved.

Urban Digital is the most common business model, which we typically observe in developed nations, especially the bus services through designated routes with terminals and specified ticketing services. This business model will strengthen the urban mobility in Timor-Leste thereby fostering economic growth. Since passengers are familiar with mobile prepaid system, it is expected that the adoption of the same will be preferred. The preference for this system increases when considering the fact that passengers can have their allocated seats even if they are boarding mid-way. Operations of *Urban Digital* ensures better management of demand and supply. The departures are scheduled and uses of terminals are encouraged. However, there are certain disadvantages. First, walking distance to pick up points might be longer than before. Second, rural areas are completely left out in terms of coverage. Third, high investments are required to set up the formal ticketing system including the terminals. Although, *Urban Digital* provides a systematic mobility service, the absence of rural footprint can have significant disadvantages to the overall economy of Timor Leste.

Pragmatic Remote provides a flexible pricing model, which is similar to typical ride-hailing models. This means that if the travelled distance is higher, higher prices will be the charged to the passenger. Also, this model provides significant opportunities to tap semi-urban and rural areas making it distinct from many of the existing car-sharing models as they find it less attractive to operate in rural regions because of the variability in demand, routes, operators, etc. *Pragmatic Remote* ensures higher network coverage leading to higher access to mobility. The challenge in this model is in structuring and coordinating pick-up points to maintain punctuality.

To summarize, *Urban digital* provides a robust structure in terms of schedule, pick up points and systematic allocation of seats within a route. However, the weakness of *Urban*

Digital (i.e. lack of access to rural regions) is the opportunity for *Pragmatic remote*. The differentiating factors of *Pragmatic Remote* and *Digital Pioneer* is the flexible pricing and passenger pooling. Although, passenger pooling strategy provides advantages to all segments of passengers in terms of price, flexible pricing is advantageous to passengers traveling short distances. **Table 8** summarizes the advantages and disadvantages of each proposed business model option for the key stakeholders.

Our business model innovation framework proposed can be extended to other contexts including BoP and financially constrained market segments (Schaefers et al., 2018). Other applications in financially constrained market segments could include offerings that could improve the livelihood of consumers such as clean drinking water, telemedicine services, etc. (Mayar, 2013; Martin, 2016).

---Insert Figure 4 here---

---Insert Table 8 here---

6.0 Discussion

Existing research on access-based business model innovation is relatively scant and most of them focus on developed markets. This scarcity of literature in frontier market context leaves the information requirements unidentified and impedes the decision-making process. In this research, we address these gaps by making three broad contributions. The first contribution concerns the identification of decision-makers' information needs for access-based business model innovation in a frontier market context through an extensive literature review. Four constructed factors of contextual intelligence summarize the key information needs in frontier markets.

The second contribution involves the development of a comprehensive decision-making framework for access-based business model innovation in frontier markets (answer to RQ 1). The framework was built by combining the contextual intelligence with business model navigator. The proposed framework proved to be analytically precise and still maintained the required broadness to be applicable in any frontier market context. The framework provides decision-makers with an adequate managerial toolset and guides them in reducing uncertainty for conducting business model innovation.

The third and final contribution comes from the application of the framework to a case study of urban mobility in Timor-Leste, a frontier market that shares great potential for adopting access-based business model innovation. Participative observation data collected on the case study indicated that limited pricing mechanisms, narrow network coverage, and lack of access for people at the BoP to be the most problematic features in Microlets' business model. By collaborating with a local consulting company and a foundation in Timor-Leste, we developed three options of innovated business model for Microlets through the systematic application of the framework integrated with the characteristics of frontier market (answer to RQ 2). Developing an on-demand and digitized version of Microlets and introducing a dynamic route-pricing model emerged to be the best solution to overcome the given challenges.

In addition to the said contributions, we believe that our paper presents some important implications in terms of demand faced by mobility service providers in Timor Leste. For instance, Pragmatic Remote business model has the potential to tap increased demand in the future due to its ability to cover large population networks both at the rural and urban level. A careful scheduling and pick up service would then be required to structure the service in view of dynamic demand fluctuations. Further, the feature of Urban digital that allows passengers to

reserve seats before boarding the vehicle essentially gives an indication of the dynamic nature of the demand at that instant. There will be days when seats are allocated at a much faster rate in comparison to other days. Such scenarios can be tackled by the concerned agencies by operating more vehicles. This would mitigate the problem of dynamic demand surge and also would ensure higher revenue collection.

6.1 Theoretical implications

The framework developed addresses the gap identified in business model innovation literature by providing guidelines on what decision-makers have to focus while innovating access-based business models in the context of frontier markets (Musacchio & Werker, 2016). Framework combines the architecture of business model innovation with unique contextual intelligence of frontier markets. This enables decision makers to gather reliable insights and be aware of the unique characteristics of the contextual setting (i.e. frontier market context) they are operating in before innovating on access-based business models (Khanna, 2014; Kutz, 2017). Therefore, this framework would help in avoiding unsubstantiated decisions that are usually uncovered late in the process of implementation.

By developing different business model options, a demonstration is provided in this study on how access-based business models can be innovated through digitization and different payment modes. The critical discussion of advantages and disadvantages of the proposed innovated business model options provided hints on potential threats and risks from a theoretical standpoint that needs to be addressed in the practical execution of the business model transformation.

To the best of our knowledge, we are not aware of research that has introduced the potential of access-based businesses to BoP of frontier markets. We address this gap by being

first to propose a framework for innovating access-based business model and applying it to Microlets, a mobility service in Timor-Leste. The application clearly indicated that the framework proposed is contextualized to the BoP of frontier market by incorporating the widely prevalent challenges - affordability, acceptability, availability and awareness (Hart & Christensen, 2002; Anderson & Markides, 2007). The framework not only provides a tool to analyze the context of the business model within the frontier market, it also provides a process structure to systematically innovate an existing business model. The analytical depth and abstract nature of the proposed framework allows for its application in other frontier market contexts.

The proposed framework is expected to accelerate the deployment of innovative access-based business models. Increased deployment would enable BoP population in the frontier market to consume livelihood-improving products such as mobility, healthcare, clean drinking water, etc., which was beyond their reach in the past (Bruton et al., 2015; Prahalad & Hammond, 2002; Matzler et al., 2015).

6.2 Managerial relevance

By splitting the framework into analytical and foundational parts, we provide practitioners meaningful insights and clarity to implement innovative business models in frontier markets. The analytical part of the framework captures the details specific to a case study in frontier market for which the access-based business model is innovated. The foundational part of the framework captures the prerequisites, which are permanent and stable for innovating any new access-based business model.

The framework can help decision-makers in coping up with the inherent uncertainty of frontier markets while developing access-based business models by examining factors such as

institutional environment, industry dynamics and infrastructural development. Drawing upon the insights derived from the contextual intelligence analysis and applying the logic of the business model navigator helped to grasp the underlying situation completely.

The application of the access-based business model innovation framework for frontier market helped to point out the limitations of Microlet's current business model. The high usage rates of mobile phones in Timor-Leste, the untapped potential of flexible pricing mechanisms, and the technologically advanced mobility solutions from developed markets revealed an opportunity to digitize the current business model of Microlets.

The concept of sharing mobility is already popular and widespread in developed cities to control pollution and congestion (Shaheen, 2016). When there are no restrictions to mobility in terms of network coverage and service quality, people are not incentivized to purchase their own vehicles (Matzler et al., 2015). Through the adoption of an existing business model (carpooling) and technology (mobile platform, payment channels) from the developed world and tailoring it to the local needs, the city of Dili could leapfrog their system to a more sustainable and efficient one without experiencing the same evolutional path of developed cities.

6.3 Limitations and future research

Our research has limitations which provide opportunities for future research. First, the framework developed is tested in a single case study and therefore lack validation from multiple frontier markets. Although we believe that the issue of shared mobility will evolve in a similar fashion in other frontier markets due to the overlapping of external factors, future studies can justify this claim and bring more meaningful insights in terms of the acceptability of alternative business model options in different markets.

Second, participative observation based data collection approach involves a certain degree of observant bias and subjectivity while collecting and interpreting data, especially when the interaction is opinion driven from individuals. The bias and subjectivity can be reduced by conducting multiple studies in different frontier markets following the same data collection design in Timor-Leste and comparing the results. This will improve the validation of the data collection procedure and further aid in the generalizability of our findings.

Third, further studies focusing on understanding the preferences of entrepreneurs in frontier markets on the business model options generated for Microlets would give interesting insights on the implementation of the business models. An expert-based Delphi study can also be conducted to increase the legitimacy, depth and certainty of the innovated business model options. Embracing the preferences of entrepreneurs and expert-based insights would validate the options and further strengthen the decision-logic.

Fourth, our research conclusions could have been more enriched if the authors knew the language spoken in Timor Leste. Although we had a local guide, we feel that the daily experience of people with mobility services in Timor-Leste could have been better captured through unstructured conversations with different stakeholders. Knowing the language could have also contributed in bridging the cultural distance between the researcher and the frontier market.

Finally, our case focuses on a specific frontier market, Timor-Leste where the mobility infrastructure related opportunities and challenges are different from remaining other frontier markets such as Senegal, Kuwait, Lebanon, Nigeria, and Serbia. Therefore, our results can benefit from a comparative study of multiple frontier markets that are at different levels of infrastructure maturity.

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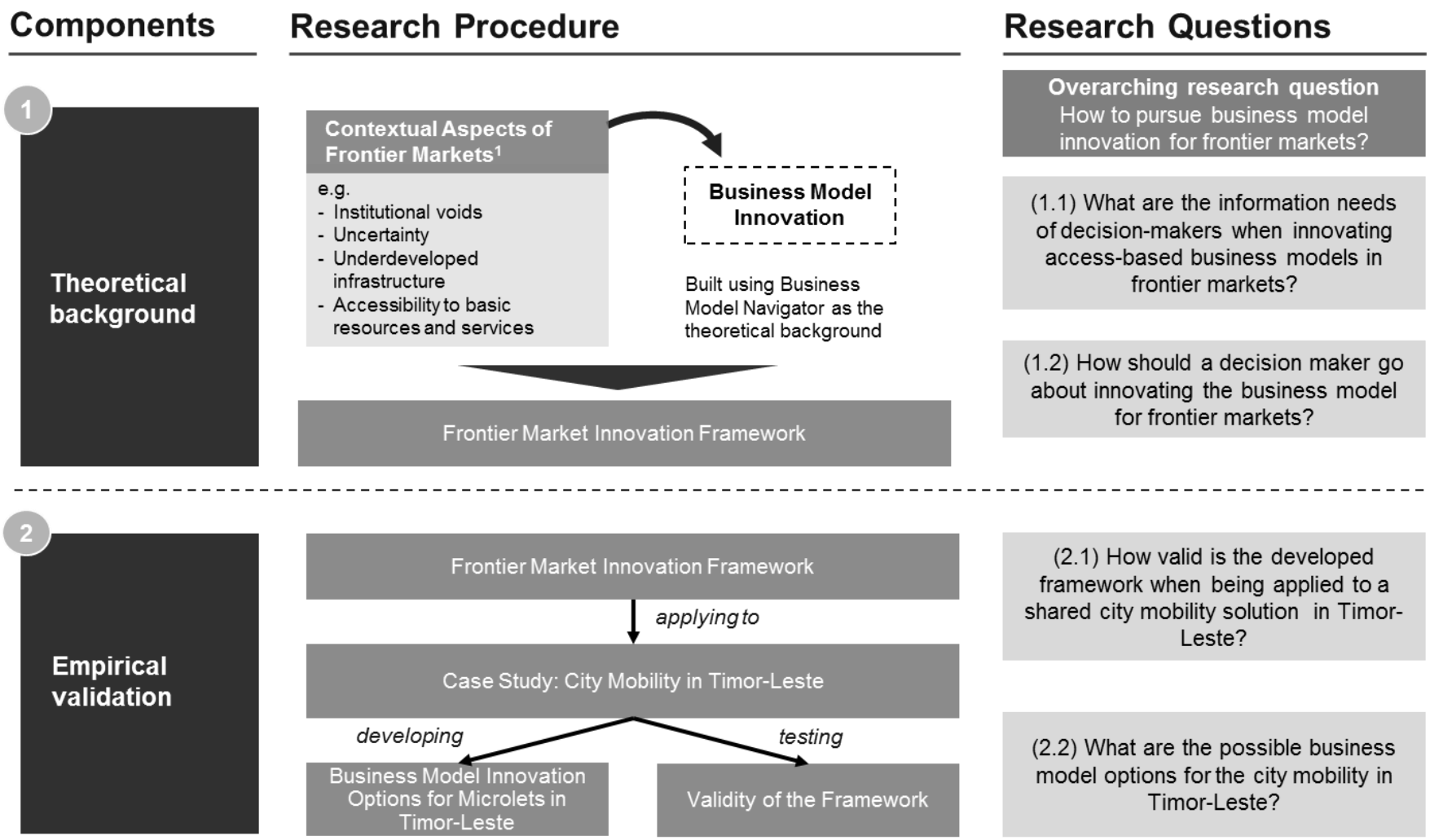
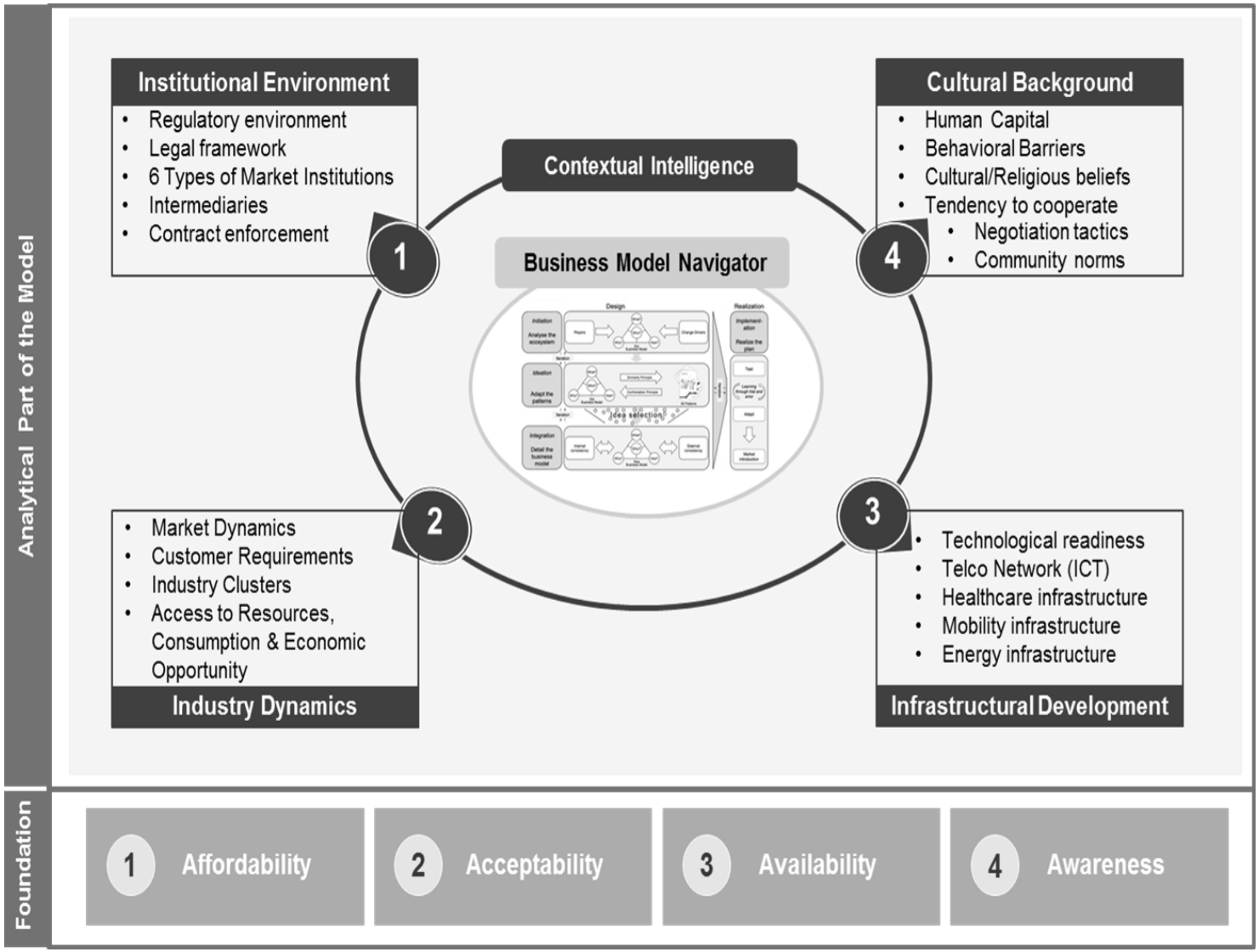
Figures

Figure 1 – Research setting embedded with research questions



[1] Preliminary examples, actual factors presented in the framework development section

Figure 2 - Frontier market innovation framework



Note: Refer to Gassmann et al. (2014) for more details on business model navigator.

Figure 3 - Sequential implementation of the frontier market innovation framework

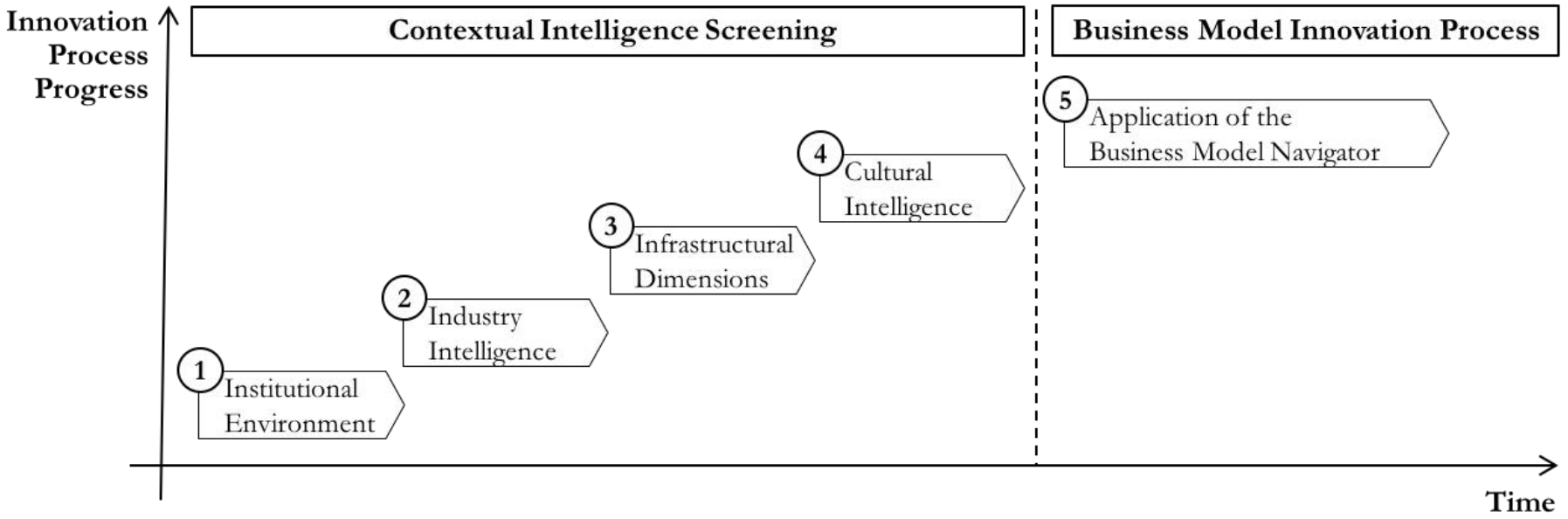
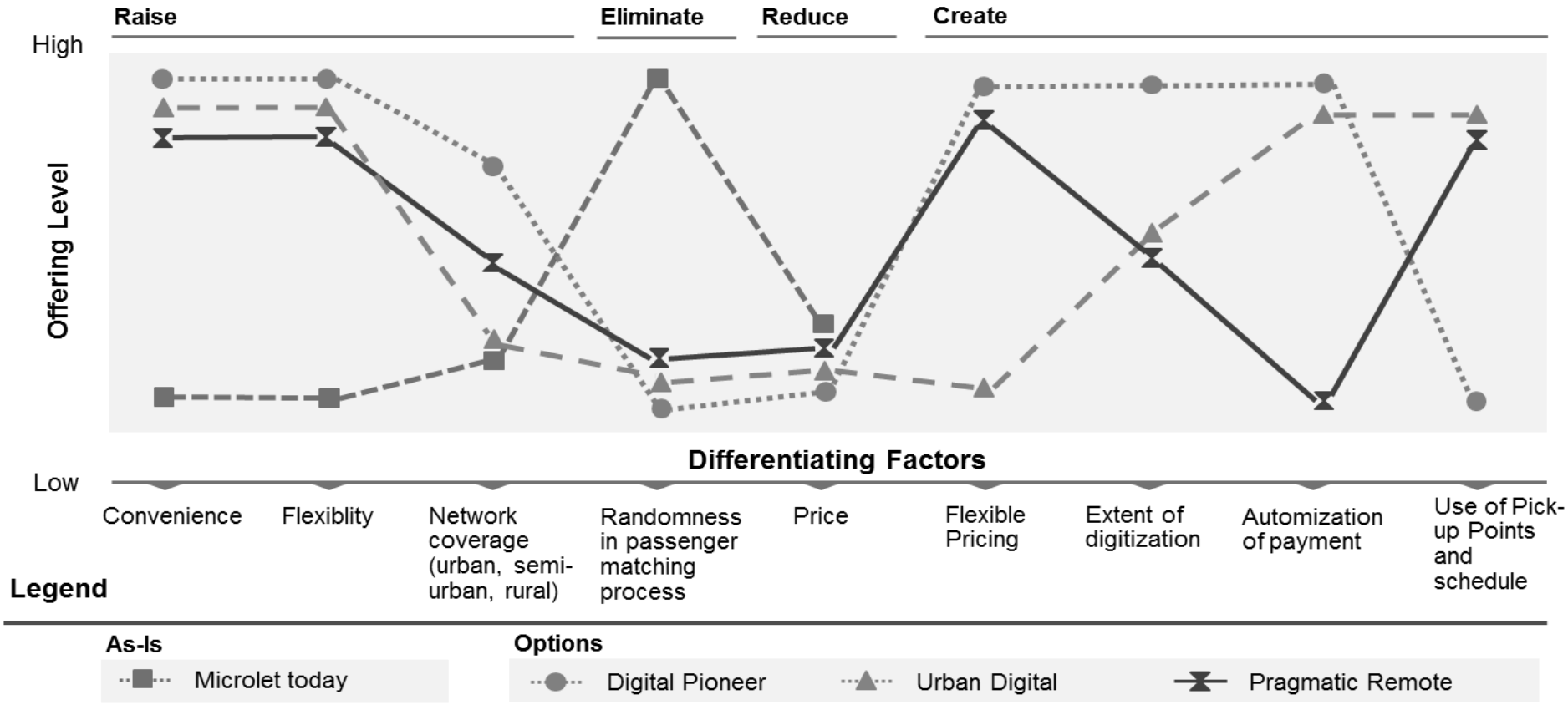


Figure 4 - Strategy canvas of Microlet's current business model and three innovative options



Tables

Table 1 – Business model definitions

No.	Author & Year	Definition
1	Johnson et al. (2008)	Business model structure is a composition of four elements. *Customer Value Proposition* (first element) is the core of the model and should be designed to fulfill a job to be done in a dramatically better way or solve a problem that has never been solved before. *Profit Formula* (second element) lays out how the company makes money through the value proposition. *Key Resources* (third element) and *Key Processes* (fourth element) are there to deliver the value proposition.
2	Casadesus-Masanell & Ricart (2010)	A business model is a reflection of the company's realized strategy, which implies that *strategy* and *business models* are not fully separable. *Tactics* on the other hand is a result of the *strategy* and clearly separated from it. The business model functions as a bridge between *strategy* and *tactics*.
3	Osterwalder and Pigneur (2010)	A business model is the rationale of how an organization creates, delivers and captures value. From this definition, a nine-component framework named the *Business Model Canvas* was derived.
4	Gassmann et al. (2014)	Business models consists of four elements – *Who, What, How and Why*. It defines *who* the target customers (segment) are, *what* the business models offers to the customer, *how* the value proposition is created, and *why* the business is profitable.

Table 2 – Challenges in frontier markets

No.	Challenge	Description
1	Institutional Environment	The legal and administrative framework has a major impact on the competitiveness and growth of a country and therefore on the attractiveness to conduct business. Unfavorable institutional environments can either pressurize companies or limit their decision-making. Frontier markets are particularly characterized with the absence of specialized intermediaries, underdeveloped regulatory systems, no contract-enforcing mechanisms and therefore lack functioning institutions (Khanna et al., 2005).
2	Uncertainty and Volatility	Frontier markets are clearly dominated by uncertainty and volatility (Redman & Sai, 2016). In order to have an effective decision-making in place, organizations need to consider decision-intelligence to identify trends, create insights and eventually reduce uncertainty (Buchanan & O'Connell, 2006). However, in a frontier market environment, where the economic structures are weak and cultural differences are large, uncertainty is hard to minimize and decision-making is impeded (Arnold & Quelch, 1998). When uncertainty is underestimated, strategies do often not defend against threats nor do they fully leverage the higher potentials that uncertainty provides (Courtney et al., 1997). Hence, an installment of the right decision-intelligence mechanisms with the right analytical rigor and contextual intelligence can help reduce uncertainty (Khanna, 2014).
3	Corruption	In frontier markets, corruption is a greater issue than in their emerging market counterparts and thus creates a chaotic market environment. Their average score on the Transparency International's corruption ranking is 4.2 while emerging market's score is at 4.7 (7.6 for developed markets) (Mehta, 2015).
4	Lack of Access to Consumption	Many people in frontier economies are at the bottom of the pyramid, what makes buying products and services a difficult undertaking (Prahalad & Hammond, 2002). However, accessibility-based business models could enable people at the BoP to consume products through rental models that emphasize temporary ownership (Matzler et al., 2015). This is especially relevant for capital goods like cars, motor-bikes, sewing machines, etc. Not many people in frontier markets could afford purchasing them (Anderson & Markides, 2007).
5	Underdeveloped Infrastructure	For a functioning economy, an extensive and efficient infrastructure is crucial. It includes mobility infrastructure (roads, railroads, ports, airports, public transport) as well as energy infrastructure (electricity supplies), healthcare and telecommunication network (for efficient business communication and digitalization). Organizations need to transport their goods and services to the market securely and in a timely manner and movement of workers to the most suitable job must be guaranteed. Underdeveloped infrastructure is one of the greatest challenges in frontier markets. Moreover, the mobility infrastructure present organizations and government agencies with significant commercial opportunities with demand growth in populous and fast growing cities.
6	Shortage of	Frontier economies are oftentimes short on capital. They do not have enough domestic savings to run their economies and

	Capital and Liquidity	to build infrastructure at the same time (Redman & Sai, 2016). The underrepresentation of financial institutions and the lack of credit thereof imposes a challenge for entrepreneurs and government agencies. As all investors need to have a long-term time frame to develop the promising fundamentals from the investment, low levels of liquidity can become a major challenge when doing business in frontier markets (Graham & Emid, 2013).
7	Lack of Innovation	In absolute terms, frontier market perform poorest on the innovation metric. In order to develop and maintain a competitive edge as an economy, frontier markets must engage in innovation. As described earlier, business model innovation can offer for a new source of innovation and offer frontier markets to gain a competitive edge (Hart & Christensen, 2002).
8	Technological Readiness	The technological readiness metric represents the extent of which economies adopts existing technologies to increase productivity of its industries – especially in its capacity to leverage information and communication technologies (ICT). Frontier economies can generate great values by merely integrating and adapting existing technologies (and the associated business models) from developed economies. The lack of installed technology allows them to leapfrog directly to state-of-the- art technologies rather than progressing through the normal evolutionary path (Arnold & Quelch, 1998).
9	Human Capital Shortage	Human Capital is inevitable for growth and development in frontier economies and are directly related with economic productivity (Redman & Sai, 2016). The poor score on the WEF Competitive Index points out that this factor poses another challenge for frontier markets.

Table 3 - Pillars of a business model

S. No.	Pilllar	Description
1	Who?	As every business model serves a particular customer segment, it should answer the question ‘who is the customer’.
2	What?	Represents the value proposition of the business model and is defined based on what the customer values or why the customer should buy a product or service.
3	How?	As a business model needs to master the processes and activities involved to achieve the value proposition, it has to clearly articulate how the value proposition can be created.
4	Why?	Captures how revenue is created with the business model or *why* the business model is financially attractive.

Source: Adapted from Gassmann et al. (2014)

Table 4 - Frontier market challenges grouped into contextual intelligence dimensions

S. No.	Contextual intelligence dimension	Frontier market challenge
1	Institutional environment	• Corruption • Shortage of capital and liquidity • Human capital shortage
2	Industry dynamics	• Uncertainty and volatility
3	Infrastructural development	• Underdeveloped infrastructure • Technological readiness
4	Cultural background	• Lack of access • Lack of innovation

Table 5 - Industry players in public transport in Timor-Leste

Mode of transportation	# of vehicles registered	# of passengers	Presence	Routes operated	Characteristics
Bus	158	24	All Timor-Leste	• Inter-district • Intra-district	• Preferably long distance routes
Anggunas	446	20	All Timor-Leste	• Intra-district	• Can carry more cargo than Microlets • Common between sub-district and central district
Microlets	623	14	10 fixed routes in Dili, 3 in Bacau; Non-fixed routes all over Timor-Leste districts	• Intra-district • City Mobility	• Most common for short trips within cities • Fee mandated by government regulations • Price is $US 0.25, no matter the distance • Registration at Dept. of Land Transportation
Taxis	N/A	4	Mostly in Dili	• Intra-district • To a lesser extent inter-district	• Chartered transportation within the city • Fees from $US 1-3/ride • Must be registered with Dept. of Land Transportation and Public Transportation Section • Licensing fee for operation; Taxi owners responsible for registration
Ojeks	N/A	1-2	Mostly in Maliana and Suai; less common in Dili	• Inter-district • City Mobility	• Most common for local trips, fewer for trips to suburbs • No regulation and few entry barriers attracts drivers leading to an oversupply

Table 6 - Key insights from contextual intelligence analysis

S. No.	Contextual intelligence factor	Description
1	Institutional environment	• Weak judicial system • Widespread corruption in government administration • Low institutional capacity/high institutional voids • Contract enforcement is dysfunctional • Moderate presence and further emergence of transaction facilitators
2	Industry dynamics	• Fragmented market - Numerous small-scale operators and vehicle owners • Taxis, Ojeks, and to a lesser extent buses are the main competitors of Microlets in city mobility
3	Infrastructural development	• Road conditions, electricity and telecommunication network as a key infrastructure enabler for Microlets • Poor road conditions in rural and semi-urban areas • Sufficient electricity in cities • Major supply gaps in urban areas • High mobile phone penetration yet low broadband
4	Cultural background	• Strong influence of Portuguese culture from colonial period • Main religion is Roman Catholicism (96.9%) with animalist influences • Official languages are Portuguese and Tetum • Working languages are English and Indonesian • Decision-making follows strict top-down principle • Strong leaders required for change • Workforce needs encouragement and motivation • Relationship-building is a key-enabler for business success

Table 7 - Transformation of the current business model of Microlets

S. No.	Pillar	Current Business Model *Microlets 1.0 – Analogue, disorganized and inefficient*	Innovated Business Model *Microlets 2.0 – Digitized, on-demand and equal access*
1	Who?	Passengers in urban areas – mostly in Dili	Passengers in urban and semi-urban areas – all over Timor-Leste
2	What?	Providing cheap and convenient mobility through operation of small vehicles	Providing cheap and convenient mobility through operation of small vehicles
3	How?	Randomly picking up passengers on designated routes within Dili with no scheduling and formal terminals	Digitized matching of passenger and operators through mobile platform allowing for maximum efficiency and transparency
4	Why?	Fare $0.25 per passenger regardless of distance Ownership and licensing cost covers by operator	Flexible pricing (Pay per Use)

Table 8 - Advantages and disadvantages of proposed business model options

Option	Microlet Operators		Passengers		Government Agencies	
	Advantages	**Disadvantages**	**Advantages**	**Disadvantages**	**Advantages**	**Disadvantages**
Digital Pioneer	• Higher revenues: Grouping passengers increases # of passenger • New revenue sources and profit pools through broader target group and larger distances	• High license cost to pay to the government to cover their cost reducing profit • Increasing competition through easy access for new operators	• Full transparency over fares and routes • Convenient usage through elimination of randomness • Grouping passengers drives overall price per person down • Higher network coverage	• Time to adapt to a new system can lead to initial confusion and delays	• Significantly higher access to mobility within population • Additional revenue stream through digital licenses of platform	• High investments for pilot solution and high maintenance cost of platform • Feasibility of pioneer solution in question
Urban Digital	• Facilitating advanced purchase of tickets • Better demand planning for operators • Scheduled departures and terminal use is encouraged	• Additional work through oversight and checking of tickets • Additional routes and revenue sources are limited since the geographical market of urban area remains the same	• Ease adoption of payment system – Citizens are already familiar with mobile prepaid systems • Passengers have the capacity to buy tickets that allocate a specific seat even if they are boarding mid-	• Walking distances to pick-up points might be longer than before • People not familiar with digital payments might be excluded from the usage of Microlets – adaption time	• The risks of unsafe overcrowding by drivers are somewhat addressed • Urban mobility is strengthened increasing flows of goods and economic growth accelerates	• High investments required to set up ticketing system & formal terminals • Increasing human resources required for system management

			route	• Limitation to predefined routes only			
Pragmatic Remote	• Untapped revenues sources through longer distances to semi-urban and rural areas	• Adhering to schedules limits flexibility for operators • Keeping up punctuality might raise difficulties with current culture	• Higher network coverage leads to increased access to mobility • Scheduling and pick-up points increases structure of the service	• Flexible pricing might lead to slightly higher prices for longer distances	• Significantly higher access to mobility within population • Relatively few changes to current model	• Coordination and construction of schedule and pick-up system will require more employees	

Appendix

Appendix A – Description of frontier market criteria

S. No.	Criteria	Description
1	Faltering prosperity	A market is said to have faltering prosperity and thereby qualifies as a frontier market if it satisfies at least one of following two conditions - a GDP per capita of less than $1,500 or it has experienced a decrease in real GDP per capita of more than 20% in a six year period over the past two decades.
2	Corruption	If a market scores below 35 on Transparency International's Corruption Perceptions Index (an index that measures the extent to which public power is misused for private benefit), it can be categorized as frontier market.
3	Arbitrary enforcements of rules and regulations	A frontier market is also identified based on the level of arbitrary enforcements of rules and regulations. If a market significantly lacks checks and balances that can stop its leaders to govern as they please, it is categorized as frontier market. According to *2014 Polity IV Index*, frontier markets score lower than three on the Polity IV "executive constraints" measure, a scale to assess the institutionalized constraints on the decision-making power of country leaders.

Source: Adapted from Musacchio and Werker (2016)

Appendix B – Comparison of frontier markets

S. No.	Country	Annual growth rate (2016)	Frontier market	Faltering prosperity (Income <$1,500)	Corruption	Arbitrary enforcement
1	Bangladesh	6.92%	Yes	☑	☑	
2	Myanmar	6.30%	Yes	☑	☑	☑
3	Kenya	6.00%	Yes	☑	☑	
4	Uganda	4.67%	Yes	☑	☑	
5	Pakistan	4.70%	Yes	☑	☑	
6	Vietnam	6.21%	Yes		☑	
7	Timor-Leste	7.8%	Yes	☑	☑	
8	India	6.82%	No			
9	China	6.70%	No			

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